

Pipeline Sensitivity Analysis

Our vacancy rate forecasts are driven by three input factors: historical space usage (in each property sector) per worker, employment forecasts, and construction pipelines. Focusing on the construction assumption, we examine which markets have the greatest potential supply-side risk. For each property sector, we start with projected pipeline data from third-party sources and make adjustments based on our assessment of market conditions to arrive at our “base case” assumptions in our vacancy and occupancy forecasting models. We also modify these assumptions to assess the relative level of exposure that each MSA has to its respective worst-case scenario construction pipeline. Our “base case” uses the most conservative construction pipeline assumptions, while the “strong case” assumes notably more aggressive pipeline assumptions.

For each property sector, we examined which MSAs had the greatest vulnerability by calculating the change in projected vacancy or occupancy rates in 2020 between the base and strong cases. Summary results are in Figure 1. Within each sector, the green highlighting (go) indicates those markets with the lowest pipeline exposure, while the yellow highlighting (caution) indicates those markets with the greatest exposure from the strong pipeline scenario. Note that because vacancy rates are compared for the office, industrial, multifamily, and retail sectors, lower or negative numbers are more desirable, indicating minimal increases (or greater declines) in vacancy. On the other hand, higher or positive changes in hotel and seniors housing occupancy rates are more desirable, as they indicate greater increases (or smaller declines) in occupancy. For the office, industrial, multifamily, and retail sectors, the table indicates by how many basis points 2020 vacancy rates would increase from the base case if the strong case pipeline were to occur. Similarly, the table shows by how many bps hotel and seniors housing occupancy rates would decline relative to the base case, should the strong case pipeline materialize.

Within each property sector, the yellow highlighting indicates the ten markets that have the greatest vulnerability to changes in pipeline assumptions, while the green highlighting indicates the ten markets with the lowest pipeline risk. In the office sector, the greatest potential increases in vacancy rates would occur in Austin, Nashville, Seattle, San Francisco, Raleigh-Durham, and New York City. On the other hand, Westchester County, and Cincinnati have no pipeline risk (based on known conditions).

In the industrial sector, the greatest pipeline risks over the next two years are projected to be in Austin, Las Vegas, Indianapolis, Tampa Bay, and Dallas-Fort Worth, while the most insulated will be Washington, D.C., San Francisco, Long Island, Detroit, and Los Angeles. Of the multifamily markets, those with the greatest pipeline exposure include Miami, Charlotte, Seattle, Washington, D.C., and Austin. Detroit, Los Angeles, San Francisco, New York City, and Orange County have the smallest multifamily construction pipelines, and therefore, the least exposure to supply-side risk. Retail markets in Miami, Orlando, San Jose, Austin, and Cleveland have the greatest potential change in vacancy rates between the base and strong pipeline scenarios, while Columbus and Portland have no pipeline risk, and San Francisco, Indianapolis, and Boston have minimal pipeline exposure.

In the hotel sector, the markets with the greatest pipeline risk include Nashville, New York City, Austin, Miami, and Seattle. At the other end of the spectrum, Chicago, Washington, D.C., St. Louis, Philadelphia, and San Francisco have limited downside from the worst-case pipeline scenarios.

In the seniors housing sector, our base case forecasting model includes only projects that are currently under construction and will therefore understate supply-side risks beyond two years. However, our moderate and strong pipeline scenarios for seniors housing assume that the pipelines grow through the duration of the 5-year projection period. As such, those markets with active near-term pipelines have the greatest occupancy differential between the base and strong cases. Those markets with no projects under construction register no pipeline risk, even for the strong case.

The IL markets that pose the greatest pipeline risk between the base and strong scenarios include Atlanta, Sacramento, Phoenix, San Diego, and Houston, while San Jose, Inland Empire, Seattle, and Tampa Bay have no risk between scenarios. The AL markets with relatively high supply-side risk include Denver, Washington, D.C., Detroit, Inland Empire, and Sacramento. In contrast, the AL markets with the lowest pipeline risk as of the fourth quarter of 2018 are Las Vegas, San Diego, and San Francisco, while San Jose, San Antonio, and Pittsburgh have no risk.

Should the “strong” scenario pipelines materialize, a number of markets will no longer be balanced at the end of 2020. The affected office markets would be Austin,

**Strong vs. Base Case Construction Pipeline Sensitivity Analysis
Increase/(Decrease) In 2020 Vacancy/Occupancy Projections (bps)**

	Office	Industrial	Multifamily	Retail	Hotel	Indep. Living	Assisted Living
Atlanta	149	89	427	17	-421	-425	-274
Austin	467	193	599	58	-832	n/a	n/a
Baltimore	84	63	273	n/a	n/a	-118	-229
Boston	124	n/a	544	5	-533	-65	-196
Charleston	189	n/a	n/a	n/a	n/a	n/a	n/a
Charlotte	237	73	670	15	n/a	n/a	n/a
Chicago	130	68	214	14	-189	-160	-197
Cincinnati	0	139	218	29	n/a	-150	-211
Cleveland	31	36	242	51	n/a	-32	-115
Columbus	162	128	444	0	n/a	n/a	n/a
Dallas	85	n/a	n/a	n/a	-563	-242	-89
Dallas-Fort Worth	n/a	148	512	22	n/a	n/a	n/a
Denver	111	106	401	20	-553	-183	-351
Detroit	30	29	171	27	-493	-22	-344
Fairfield County	73	n/a	n/a	n/a	n/a	n/a	n/a
Fort Lauderdale	161	76	n/a	n/a	n/a	n/a	n/a
Fort Worth	68	n/a	n/a	n/a	n/a	n/a	n/a
Houston	68	98	376	31	-410	-260	-99
Indianapolis	106	179	349	3	n/a	n/a	n/a
Inland Empire	10	n/a	n/a	n/a	n/a	0	-334
Kansas City	n/a	n/a	n/a	n/a	n/a	-137	-84
Las Vegas	n/a	184	n/a	n/a	-277	-165	-12
Long Island	9	25	n/a	n/a	n/a	n/a	n/a
Los Angeles	74	32	185	18	-569	-143	-111
Memphis	25	n/a	n/a	n/a	n/a	n/a	n/a
Miami	191	87	1045	135	-673	-33	-278
Minneapolis	176	91	421	10	-401	-6	-262
Nashville	450	127	581	9	-945	n/a	n/a
New York City	243	n/a	204	47	-839	-192	-221
North & Central NJ	32	52	n/a	n/a	n/a	n/a	n/a
Orange County	75	n/a	209	n/a	n/a	n/a	n/a
Orlando	68	116	490	115	-460	-77	-118
Philadelphia	22	147	273	10	-319	-72	-298
Phoenix	164	106	302	15	-434	-274	-270
Pittsburgh	n/a	n/a	n/a	n/a	n/a	-139	0
Portland	120	63	564	0	n/a	-40	-183
Raleigh-Durham	290	n/a	n/a	n/a	n/a	n/a	n/a
Sacramento	n/a	n/a	n/a	n/a	n/a	-328	-304
St. Louis	179	110	262	15	-289	-166	-105
San Antonio	n/a	n/a	n/a	n/a	n/a	-29	0
San Diego	140	46	264	25	-432	-271	-19
San Francisco	319	25	188	1	-339	-65	-42
San Jose	162	n/a	526	102	n/a	0	0
Seattle	428	73	624	10	-579	0	-81
Tampa Bay	118	154	299	24	-389	0	-155
Washington, D.C.	164	10	569	31	-245	-58	-347
Westchester County	0	n/a	n/a	n/a	n/a	n/a	n/a
West Palm Beach	26	n/a	n/a	n/a	n/a	n/a	n/a

Legend:



 10 MSAs with greatest pipeline exposure (greatest negative impact on vacancy/occupancy rates).
 10 MSAs with smallest pipeline exposure (smallest negative impact on vacancy/occupancy rates).
 n/a indicates no sector forecast for that MSA.

figure 1

New York City, Raleigh-Durham, and Seattle. In the industrial sector, the Chicago, Columbus, Denver, Inland Empire, Long Island, and Orlando markets would fall out of balance in 2020 if the strong pipeline occurred. Multifamily markets that would fall out of favor if the strong pipeline occurred include Atlanta, Austin, Baltimore, Boston, Cincinnati, Cleveland, Columbus, Houston, Minneapolis, Orange County, Orlando, Philadelphia, Raleigh-Durham, San Jose, Seattle, and Tampa Bay. The relatively large number of affected markets indicates that

multifamily developers are becoming increasingly confident about the strength of the market. In the retail sector, only the Miami market would fall out of balance in 2020 due to the strong pipeline scenario. In the hotel sector, the Atlanta, Boston, Denver, Miami, Philadelphia, Phoenix, Tampa Bay, and Washington, D.C. markets will fall out of balance compared to the base case should the strong pipeline come to fruition. Of the IL and AL seniors housing markets, none would fall out of balance under the strong pipeline scenarios.

The following sample sensitivity tables (Base, Moderate, and Strong cases) for each property sector (office, industrial, multifamily, retail, hotel, independent living, and assisted living) are updated and posted to the subscriber page each quarter.

Pipeline Sensitivity Analysis

Independent Living Occupancy Rates - Base Case Pipeline				
Market	YE 2019 Est.	YE 2020 Est.	YE 2021 Est.	YE 2022 Est
Atlanta	81.6%	82.6%	84.4%	86.2%
Baltimore	93.0%	94.1%	95.2%	96.3%
Boston	95.1%	96.4%	98.0%	99.6%
Chicago	87.5%	88.0%	88.7%	89.4%
Cincinnati	93.0%	93.8%	94.8%	95.8%
Cleveland	89.4%	90.4%	91.6%	92.7%
Dallas	85.8%	87.0%	88.6%	90.2%
Denver	88.0%	88.7%	90.0%	91.4%
Detroit	90.0%	90.8%	92.1%	93.1%
Houston	81.2%	82.2%	83.5%	84.8%
Inland Empire	89.5%	91.8%	94.1%	96.5%
Kansas City	84.3%	84.7%	85.5%	86.2%
Las Vegas	82.5%	84.6%	87.1%	89.5%
Los Angeles	91.2%	91.9%	92.9%	93.9%
Miami	88.1%	89.4%	90.8%	92.2%
Minneapolis	94.2%	95.5%	96.9%	98.2%
New York City	90.8%	91.6%	92.7%	93.8%
Orlando	87.2%	89.3%	91.4%	93.5%
Philadelphia	91.8%	92.5%	93.3%	94.3%
Phoenix	84.0%	85.7%	87.7%	89.6%
Pittsburgh	92.0%	91.8%	92.0%	92.3%
Portland	95.5%	97.3%	99.4%	101.5%
Sacramento	91.0%	92.6%	94.7%	96.8%
St. Louis	88.9%	89.3%	90.0%	90.6%
San Antonio	86.3%	88.1%	90.0%	92.0%
San Diego	90.6%	91.9%	93.9%	95.8%
San Francisco	92.7%	94.1%	95.6%	97.1%
San Jose	98.8%	100.5%	102.1%	103.6%
Seattle	96.0%	99.1%	102.2%	105.4%
Tampa Bay	88.3%	89.5%	90.9%	92.6%
Washington, D.C.	92.0%	93.3%	95.0%	96.6%

Highlighted entries indicate market at supply-demand balance, or better.

*Source: The National Investment Center for the Seniors Housing & Care Industry

Note on occupancy greater than 100%: In order to calculate estimated occupancy rates, we adjust beginning inventory for new construction completions and compare that to net absorption (including sublease space). If we show 100%+ occupancy rates, it simply means that given the scheduled supply and growth in expected demand, sufficient demand pressure exists to more than absorb all available space. Of course, 100%+ occupancy cannot occur, as in the face of such demand pressure additional development will occur and rents will increase in order to dampen demand. Therefore, forecasts of 100%+ occupancy should be viewed as a strong excess demand indicator.



Pipeline Sensitivity Analysis

Independent Living Occupancy Rates - Moderate Case Pipeline				
Market	YE 2019 Est.	YE 2020 Est.	YE 2021 Est.	YE 2022 Est
Atlanta	79.9%	80.1%	81.9%	83.7%
Baltimore	92.5%	93.4%	94.5%	95.6%
Boston	94.8%	96.0%	97.6%	99.2%
Chicago	86.9%	87.0%	87.8%	88.4%
Cincinnati	92.4%	92.9%	93.9%	94.9%
Cleveland	89.3%	90.2%	91.4%	92.5%
Dallas	84.9%	85.7%	87.2%	88.7%
Denver	87.3%	87.7%	88.9%	90.3%
Detroit	89.9%	90.6%	91.9%	93.0%
Houston	80.2%	80.7%	82.0%	83.2%
Inland Empire	89.5%	91.8%	94.1%	96.5%
Kansas City	83.8%	83.9%	84.8%	85.4%
Las Vegas	81.9%	83.7%	86.1%	88.5%
Los Angeles	90.6%	91.1%	92.1%	93.1%
Miami	88.0%	89.2%	90.6%	92.0%
Minneapolis	94.2%	95.4%	96.8%	98.2%
New York City	90.0%	90.5%	91.6%	92.7%
Orlando	86.9%	88.9%	90.9%	93.1%
Philadelphia	91.5%	92.1%	92.9%	93.8%
Phoenix	83.0%	84.1%	86.1%	88.0%
Pittsburgh	91.4%	91.1%	91.2%	91.5%
Portland	95.3%	97.1%	99.2%	101.3%
Sacramento	89.8%	90.7%	92.8%	94.9%
St. Louis	88.3%	88.4%	89.0%	89.7%
San Antonio	86.2%	87.9%	89.8%	91.8%
San Diego	89.5%	90.4%	92.3%	94.2%
San Francisco	92.4%	93.8%	95.3%	96.7%
San Jose	98.8%	100.5%	102.1%	103.6%
Seattle	96.0%	99.1%	102.2%	105.4%
Tampa Bay	88.3%	89.5%	90.9%	92.6%
Washington, D.C.	91.7%	93.0%	94.6%	96.3%

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Pipeline Sensitivity Analysis

Independent Living Occupancy Rates - Strong Case Pipeline				
Market	YE 2019 Est.	YE 2020 Est.	YE 2021 Est.	YE 2022 Est
Atlanta	78.6%	78.3%	80.1%	81.8%
Baltimore	92.2%	92.9%	94.0%	95.1%
Boston	94.6%	95.8%	97.3%	98.9%
Chicago	86.4%	86.4%	87.1%	87.7%
Cincinnati	92.0%	92.3%	93.3%	94.2%
Cleveland	89.2%	90.1%	91.2%	92.4%
Dallas	84.2%	84.6%	86.1%	87.7%
Denver	86.8%	86.9%	88.1%	89.5%
Detroit	89.9%	90.5%	91.8%	92.9%
Houston	79.4%	79.6%	80.9%	82.1%
Inland Empire	89.5%	91.8%	94.1%	96.5%
Kansas City	83.4%	83.3%	84.2%	84.8%
Las Vegas	81.4%	83.0%	85.4%	87.7%
Los Angeles	90.2%	90.5%	91.5%	92.4%
Miami	87.9%	89.0%	90.4%	91.9%
Minneapolis	94.2%	95.4%	96.8%	98.2%
New York City	89.5%	89.7%	90.7%	91.8%
Orlando	86.7%	88.5%	90.6%	92.7%
Philadelphia	91.3%	91.7%	92.6%	93.5%
Phoenix	82.2%	83.0%	84.9%	86.8%
Pittsburgh	91.0%	90.5%	90.6%	90.9%
Portland	95.2%	96.9%	99.0%	101.1%
Sacramento	88.8%	89.3%	91.3%	93.4%
St. Louis	87.8%	87.7%	88.3%	89.0%
San Antonio	86.1%	87.8%	89.7%	91.7%
San Diego	88.7%	89.2%	91.1%	93.0%
San Francisco	92.2%	93.5%	95.0%	96.4%
San Jose	98.8%	100.5%	102.1%	103.6%
Seattle	96.0%	99.1%	102.2%	105.4%
Tampa Bay	88.3%	89.5%	90.9%	92.6%
Washington, D.C.	91.6%	92.8%	94.4%	96.0%

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